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Christi A. Butner

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Brendes et al.

Group Art Unit: 2142

**Serial No.: 09/770,316**

Examiner: Hieu C. Le

Filed: January 26, 2001

Docket No.: 1322/49/2

Confirmation No.: 7016

For: METHODS AND SYSTEMS FOR PROVIDING CONVERGED NETWORK MANAGEMENT FUNCTIONALITY IN A GATEWAY ROUTING NODE

DECLARATION UNDER 37 C.F.R. § 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

We, Dan Alan Brendes, Joseph William Keller, and Seetharaman Khadri, being the inventors of the subject matter of the claims in the above-referenced U.S. patent application, declare as follows:

1. Prior to March 31, 2000, we jointly conceived, in the United States, of the claimed invention of detecting a network management event regarding the status of a node in the SS7 network and communicating the operational status information to nodes in the IP network

2. As evidence of our conception of the claimed invention prior to March 31, 2000, and our due diligence in reducing the invention to practice, we attach Exhibit A, which will now be explained in detail.

3. Exhibit A is a copy of a portion of U.S. provisional patent application no. 60/208,532, filed June 1, 2000. In particular, Exhibit A includes a document entitled "IP7 Secure Gateway 2.0 MTP Primitives," which describes technical features of the claimed invention developed by us. Activities relating to the development of the subject matter disclosed in the document occurred at the assignee's offices in Morrisville, North Carolina, USA. On page 2 of the document, it is indicated that the document was revised on August 2, 1999 and October 11, 1999. Thus, all of the contents of the document were generated at least as early as October 11, 1999, prior to March 31, 2000. The document in Exhibit A describes the MTP Primitives feature. The MTP Primitives feature relates to notifying the nodes in the IP network of the status of point codes in the SS7 network in response to network management event. For example, in §1.1, Purpose and Scope, the document states,

> This document describes the MTP Primitives feature (feature #009 of [2]) that will be introduced in the IP 2.0 release. The status of the point codes in the SS7 networks needs to be made available to IP connected MGCs and IP-SCPs. This feature provides MTP status in the SS7 network to IP connected network elements through the MTP Primitives sent over the TALI protocol. The MTP Primitives function similar to the MTP3 network management procedures for TFA, TCA, TFP, TCP, TFC and UPU. The MTP Primitives function also provides the ability for an IP device to generate RCT messages.

The passage above indicates that the MTP Primitives feature performs MTP3 network management procedures for TFA, TCA, TFP, TCP, TFC and UPU,

which includes detecting network management events, and communicates point code status information to IP connected network elements.

4. In Figure 1 on page 9 of the attached document, the signaling gateway detects certain network management events related to prohibited, allowed, and congested point codes and communicates that status information to IP nodes.

5. We continuously worked on the MTP Primitives feature, which embodies the claimed steps of detecting a network management event regarding the status of a node in the SS7 network in communicating the operational status to selected nodes in the IP network, from its conception date of at least as early as August 2, 1999, until the feature was reduced to practice.

Serial No.: 09/770,316

We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dan Alan Brendes — Date: 4/5/2005

Joseph William Keller — Date

Seetharaman Khadri — Date

Enclosures:

Exhibit A: Tekelec IP7 Secure Gateway 2.0 MTP Primitives, Rev. 1.1 (10-11-1999)

We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dan Alan Brendes — Date

Joseph William Keller — Date 4/5/2005

Seetharaman Khadri — Date

Enclosures:

Exhibit A: Tekelec IP7 Secure Gateway 2.0 MTP Primitives, Rev. 1.1 (10-11-1999)

We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dan Alan Brendes _____ Date _____

Joseph William Keller _____ Date _____

Seetharaman Khadri _____ Date 4/6/2005

Enclosures:

Exhibit A: Tekelec IP7 Secure Gateway 2.0 MTP Primitives, Rev. 1.1 (10-11-1999)

# Addendum

Attachment 1

METHODS AND SYSTEMS FOR PROVIDING CONVERGED NETWORK MANAGEMENT FUNCTIONALITY IN A GATEWAY ROUTING NODE

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| Title: | IP7 Secure Gateway 2.0 MTP Primitives Feature Description | | | | |
|---|---|---|---|---|---|
| Doc Number: | Fd0027822 | PVCS Revision #: | 1.1 | ECN: | |

**IP7®**

Feature Description

# IP7 Secure Gateway 2.0 MTP Primitives

Keller, Khadri

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# CHANGE HISTORY

| Date | PVCS Revision # | Author | Revision Description | Approved |
|---|---|---|---|---|
| 8/2/99 | 1.0 | Keller, Khadri | New document | No |
| 10/11/99 | 1.1 | Keller | Updated with review comments | Yes |

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# 1. INTRODUCTION

## 1.1 Purpose and Scope

This document describes the MTP Primitives feature (feature #009 of [2]) that will be introduced in the IP$^7$ 2.0 release. The status of the point codes in the SS7 networks needs to be made available to IP connected MGCs and IP-SCPs. This feature provides MTP status in the SS7 network to IP connected network elements through the MTP Primitives sent over the TALI protocol. The MTP Primitives function similar to the MTP3 network management procedures for TFA, TCA, TFP, TCP, TFC and UPU. The MTP Primitives function also provides the ability for an IP device to generate RCT messages.

The benefits of this feature include:

- Ability for an IP device to divert traffic from a SG that is not able to access a point code that the mated SG can access
- Ability for an IP device to audit point code status
- Ability for an IP device to build up routing tables before sending traffic (similar to MTP Restart feature)
- Ability for an IP device to be warned about SS7 network congestion
- Ability for an IP device to abate congestion
- Ability for an IP device to obtain SS7 User Part Unavailability status

This document will be used by designers to write design specifications, by test organizations to write test cases, and by the Customer Documentation Team to write customer documents.

## 1.2 References


[1] *TEKELEC Acronym Guide*, 070203M0.MWD, Revision 1.14, Tekelec, August 1996.
[2] *IP$^7$ Secure Gateway 2.0 Product Functional Specification*, pf002525.doc, Revision 1.5, J. Mason, Sept. 1999.
[3] *Transport Adapter Layer Interface 2.0*, tr002733.doc, Revision 1.2, M. Xu, Sept. 1999.
[4] *IP7 Release 2.0 Performance and Capacity Enhancements*, fd002846.doc, Revision 1.2, Brendes, Sept. 1999.
[5] *TSRC, Detail Design Specification*, 2dd20113.doc, Revision 1.3, Tekelec, Feb 1996.
[6] *Maintenance Commands for IP7*, cs002268.doc, Revision 1.15, Tekelec, Sept 1999.
[7] *Error Response on Input*, cs000100.doc, Revision 1.173, Tekelec, Sept 1999.
[8] *IP7 Release 2.0 Routing Key Registration*, fd002844.doc, Revision 1.0, Tekelec, Sept 1999.
[9] *LNP Platform FD*, 2fd22098.doc, Revision 1.39, Tekelec, July 16, 1999.
[10] *MTP Restart*, 2fd21006.doc, Revision 1.6, Tekelec, July 9, 1996.
[11] *Bell Communications Research Specification of Signalling System Number 7*, GR-246-CORE, Issue 3, December 1998.


## 1.3 Acronyms

In addition to the acronyms defined in [1], the acronyms below are used in the document.

| Acronym | Definition |
|---|---|
| IP-NE | Internet Protocol Network Element |
| IP-SCP | Internet Protocol Switching Control Point |
| MGC | Media Gateway Controller |
| SG | Secure Gateway |
| TALI | Transport Adoption Layer Interface |

**Table 1: List of Acronyms**

## 2. GENERAL DESCRIPTION

MTP status is provided by the Secure Gateway to the IP connected network elements through new TALI messages defined in [3]. The new TALI messages are:

- Point Code Unavailable (PC UA)
- Point Code Available (PC AV)
- Request for Point Code Status (PC AUD)
- Cluster Unavailable (CL UA)
- Cluster Available (CL AV)
- Request for Cluster Status (CL AUD)
- Congested Destination, w/ Cong Level (CONG LVL)
- Request for Congestion Status (CONG AUD)
- User Part Unavailable (UP UA)

This feature is for the SS7IPGW build only. The IPLIM GPL uses native MTP3 messages to communicate with its far end peer so there is no need to convert these messages to primitives.

### 2.1 Terminology

Some terms that are used throughout the document need to be defined:

1) Service PDU - MSU received from an IP node. These messages will have either the saal, mtp3, isot or sccp opcode.
2) Broadcast phase - autonomous notifications of point code/cluster changes that are transmitted to all IP nodes. Broadcasts will occur because of a receipt of a network management message or a link related event.
3) Response method - primitives transmitted in response to previously sent service PDU from an IP node.
4) Audit - an on-demand request from an IP node for either point code availability or congestion status. Throughout this document, the term audit, request and query are used interchangably.
5) Primitive replication - a single event causing copying of a single primitive for transmission on multiple sockets. All broadcast phase primitives require replication. Some response method primitives require replication if the originating socket is not known. Further details can be found in Section 3.3.
6) Capacity – maximum amount of offered load available for processing. The expected capacity is 1000/2000 MSU/sec depending on the hardware used. For more information, please refer to [4].

## 2.2 TALI MTPP Primitives

The MTP Primitive (mtpp) message structure, as shown in Table 2, is defined in [3] and repeated here for clarity.

| Octets | Field Name | Description |
|---|---|---|
| 0..3 | SYNC | 'TALI' |
| 4..7 | OPCODE | 'mgmt' |
| 8..9 | LENGTH | Length |
| 10..13 | PRIMITIVE | 'mtpp' |
| 14..17 | Primitive OPERATION | The OPERATION field specifies the 1 operation within the group of operations identified by the primitive. |
| 18... | Message Data | The content of the message data area is dependent on the combination of opcode/primitive/operation fields. Each of those combinations could use a different message data structure. |

**Table 2: Message Structure for MTP Primitives**

The Primitive Operation and Message Data fields of the message, as shown in Table 3, is defined in [3] and repeated here for clarity.

| # bytes | Field Name | Description | Type of Field |
|---|---|---|---|
| 2 | MTPP Operation | Identifies which 'mtpp' operation/capability is provided in this message.<br>This integer field uses the following encodings:<br>0x0001 = Point Code Unavailable<br>0x0002 = Point Code Available<br>0x0003 = Request for Point Code Status<br>0x0004 = Cluster Unavailable<br>0x0005 = Cluster Available<br>0x0006 = Request for Cluster Status<br>0x0007 = Congested Destination, w/ Cong Level<br>0x0008 = Request for Congestion Status<br>0x0009 = User Part Unavailable | Integer |
| 4 | Concerned Point Code | Identifies the SS7 Point Code that is relevant to the mtpp operation. The mtpp operation is concerning this pt code (or cluster). | SS7 Pt Code |

| # bytes | Field Name | Description | Type of Field |
|---|---|---|---|
| 4 | Source Point Code | This field is only used on the 'Congested Destination' and 'Request for Congestion Status' operations.<br>• When used in an 'Congestion Destination' operation, this field contains the Pt Code of the Source of the traffic that was experiencing congestion as it made its way to the Concerned Pt Code. In terms of the original SS7 MSUs (the TransFer Controlled MSU) that provided congestion information, the CPC of the TFC is the 'Concerned Point Code' of the resulting MTPP primitive and the DPC of the TFC is the 'Source Point Code' of the resulting MTPP primitive.<br>• When used in an 'Request for Congestion Status' operation, this field indicates which Source Pt Code is trying to abate the congestion of the concerned Pt Code. In terms of the original SS7 MSUs (the Route Congestion Test MSU) that is used to poll for congestion, the DPC of the RCT is the 'Concerned Point Code' of the MTPP primitive and the OPC of the RCT is the 'Source Point Code' of the MTPP primitive. | SS7 Pt Code |
| 2 | Congestion Level | This field is used on the 'Congested Destination' and 'Request for Congestion Status' operations to indicate the congestion level of the destination.<br>This integer field uses the following encodings:<br>0x0000 = Congestion Level 0<br>0x0001 = Congestion Level 1<br>0x0002 = Congestion Level 2<br>0x0003 = Congestion Level 3 | Integer |
| 2 | Cause Code | This field is used on the 'User Part Unavailable' operation to indicate the Cause Code for why the UPU is being sent.<br>This integer field uses the following encodings:<br>0x0000 = Cause Unknown<br>0x0001 = User Part Unequipped<br>0x0002 = User Part Inaccessible | Integer |
| 2 | User ID | This field is used on the 'User Part Unavailable' operation to indicate which user part is unavailable. | Integer |

**Table 3: Message Data Structure to be used with the 'mtpp' PRIMITIVE**

Table 4 indicates the Required (R), Conditionally Required (CR), or Not Applicable (NA) status for each field of the message data structure in Table 3 based on the MTPP Operation field. As mentioned previously, unused fields (those marked NA) should be initialized to 0 by the sender and ignored by the receiver.

| Field / Operation | Concerned Pt Code | Source Pt Code | Congestion Level | Cause Code | User ID |
|---|---|---|---|---|---|
| **Point Code Unavailable** | R | NA | NA | NA | NA |
| **Point Code Available** | R | NA | NA | NA | NA |
| **Request for Point Code Status** | R | NA | NA | NA | NA |
| **Cluster Unavailable** | R | NA | NA | NA | NA |
| **Cluster Available** | R | NA | NA | NA | NA |
| **Request for Cluster Status** | R | NA | NA | NA | NA |
| **Congested Destination, w/ Cong Level** | R | R | R | NA | NA |
| **Request for Congestion Status** | R | R | R | NA | NA |
| **User Part Unavailable** | R | NA | NA | R | R |

**Table 4: Required/Conditionally Required/Not Applicable Fields for each MTPP Operation**

Figure 1 shows the MTP Primitives that flow between the SG and an IP node. In addition, the SS7 network management messages that concern the MTP Primitives feature are shown between the SG and a remote SS7 network element. Not all SS7 management messages, such as changeover, are shown even though they may have a relationship to the MTP Primitives.

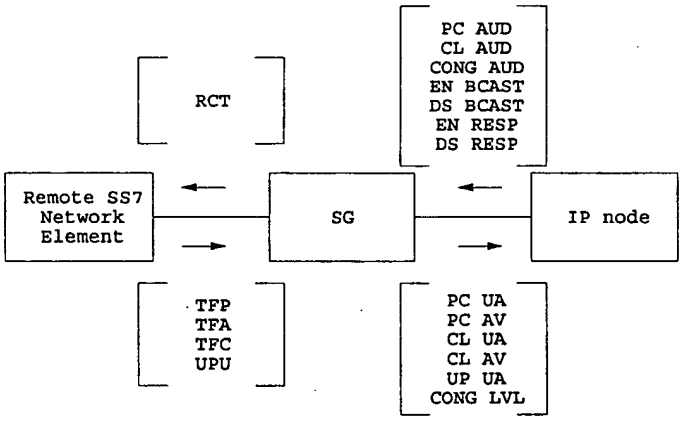


**Figure 1: Primitive Flow with External Devices**

Figure 2 shows the MTP Primitives that flow between the layers of the SG. In addition, the SS7 network management messages that concern the MTP Primitives feature are shown between the MTP3 and Gateway Layer.

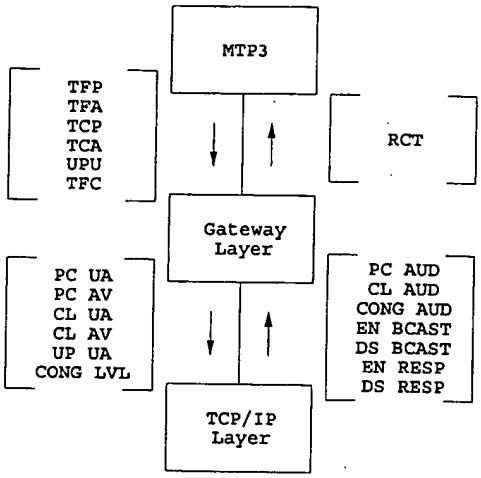


**Figure 2: Primitive Flow within the SG**

As shown in Figure 1, the SG is not expecting to receive point code/cluster availability/unavailability or congestion level primitives. The SG will discard these primitives if they are received. The NA in the Received column in Table 5 indicates this.

As a matter of fact, the MTP Primitives are not intended for SG to SG communication. SG to SG communication is expected to use IPLIM links that uses native MTP3 for communication.

The Transmitted column of Table 5 indicates which primitives are transmitted from the SG and when. Note that NA means the SG doesn't send the primitive.

| Primitive | Broadcast phase | Response method | In Reply to an Audit | Transmitted | Received |
|---|---|---|---|---|---|
| Point Code Unavailable (PC UA) | Yes | Yes | Yes | Yes | NA |
| Point Code Available (PC AV) | Yes | No | Yes | Yes | NA |
| Request for Point Code Status (PC AUD) | NA | NA | NA | No | Yes |
| Cluster Unavailable (CL UA) | Yes | Yes | Yes | Yes | NA |
| Cluster Available (CL AV) | Yes | No | Yes | Yes | NA |
| Request for Cluster Status (CL AUD) | NA | NA | NA | No | Yes |
| Congested Destination, w/ Cong Level (CONG LVL) | No | Yes | No | Yes | NA |
| Request for Congestion Status (CONG AUD) | NA | NA | NA | No | Yes |
| User Part Unavailable (UP UA) | No | Yes | No | Yes | NA |

**Table 5: Primitive Communication**

The mapping of events and their corresponding actions for this feature is shown in Table 6. The three reasons an IP device will receive primitives are broadcast phase state change notifications, response method notifications and responses to status queries. Both the broadcast phase and response method requires the IP device to enable transmission of these primitives as described in Section 3.1. If the IP device doesn't send any queries, it won't receive any responses to queries.

| | | Event | Action | Socket used for transmission |
|---|---|---|---|---|
| Broadcast Phase | 1 | MTP3 sends Gateway Layer TFP for IP Node | Gateway Layer sends PC UA to IP Node(s) | Replicated to all which have **broadcast phase** primitives enabled |
| | 2 | MTP3 sends Gateway Layer TCP for IP Node | Gateway Layer sends CL UA to IP Node(s) | Replicated to all which have **broadcast phase** primitives enabled |
| | 3 | MTP3 sends Gateway Layer TFA for IP Node | Gateway Layer sends PC AV to IP Node(s) | Replicated to all which have **broadcast phase** primitives enabled |
| | 4 | MTP3 sends Gateway Layer TCA for IP Node | Gateway Layer sends CL AV to IP Node(s) | Replicated to all which have **broadcast phase** primitives enabled |
| Response Method | 5 | MTP3 sends Gateway Layer UPU for IP Node | Gateway Layer sends UP UA with cause code based on UPU | Replicated to all which have **response method** primitives enabled and socket matches criteria defined in Section 3.4 |
| | 6 | MTP3 sends Gateway Layer TFC for IP Node | Gateway Layer sends CONG LVL with cause code based on TFC | Replicated to all which have **response method** primitives enabled and socket matches criteria defined in Section 3.4 |
| | 7 | IP Node sends Gateway Layer service PDU and DPC is unavailable | Gateway Layer sends PC UA to IP Node | Same socket service PDU received if **response method** primitives are enabled |
| | 8 | IP Node sends Gateway Layer service PDU and cluster is unavailable | Gateway Layer sends CL UA to IP Node | Same socket service PDU received if **response method** primitives are enabled |
| Audit | 9 | IP Node sends Gateway Layer PC AUD and PC is unavailable as determined by criteria in Table 11 | Gateway Layer sends PC UA or CL UA to IP Node | Same socket PC AUD received |
| | 10 | IP Node sends Gateway Layer PC AUD and PC is available as determined by criteria in Table 11 | Gateway Layer sends PC AV to IP Node | Same socket PC AUD received |
| | 11 | IP Node sends Gateway Layer CL AUD and cluster is unavailable as determined by criteria in Table 11 | Gateway Layer sends CL UA to IP Node | Same socket CL AUD received |
| | 12 | IP Node sends Gateway Layer CL AUD and cluster is available as determined by criteria in Table 11 | Gateway Layer sends CL AV to IP Node | Same socket CL AUD received |
| | 13 | IP Node sends Gateway Layer CONG AUD | Gateway Layer builds and transmits RCT to MTP3 for routing | N/A |

**Table 6: MTP Primitive Event/Action Mapping**

# 3. DETAILED DESCRIPTION

## 3.1 Transmission Filtering

The Socket Options Registration Primitive (sorp) message, as shown in Table 7, is defined in [3] and repeated here for clarity. The Primitive Operation and Message Data fields of the message, as shown in Table 8, is defined in [3] and repeated here for clarity. This primitive allows an IP device to dynamically enable/disable the SG transmitting of broadcast phase and response method MTP Primitives. Only Bits 0 and 1 of the SORP flags are of concern for this feature. Broadcast phase and response method filtering are independent of each other.

| Octets | Field Name | Description |
|---|---|---|
| 0..3 | SYNC | 'TALI' |
| 4..7 | OPCODE | 'mgmt' |
| 8..9 | LENGTH | Length |
| 10..13 | PRIMITIVE | 'sorp' |
| 14..17 | Primitive OPERATION | The OPERATION field specifies the 1 operation within the group of operations identified by the primitive. |
| 18... | Message Data | The content of the message data area is dependent on the combination of opcode/primitive/operation fields. Each of those combinations could use a different message data structure. |

**Table 7: Socket Options Registration Primitive**

| # bytes | Field Name | Description | Type of Field |
|---|---|---|---|
| 2 | SORP Operation | Identifies which 'sorp' operation/capability is provided in this message.<br>This integer field uses the following encodings:<br>0x0001 = Set SORP Flags<br>0x0002 = Request Current SORP Flags Settings<br>0x0003 = Reply w/ Current SORP Flag Settings | Integer |
| 4 | SORP Flags | A 4 byte bit-field that uses each bit as an enabled/disabled flag for a particular socket option.<br>Bit 0 is the least significant bit, bit 31 is the most significant bit.<br>Bit x = 0 indicates the option is DISABLED.<br>Bit x = 1 indicates the option is ENABLED.<br><br>The assignments for each BIT are as follows<br>Bit 0 = Broadcast Phase MTPP Primitives<br>Bit 1 = Response Method MTPP Primitives<br>Bit 2 = Normalized SCCP<br>Bit 3 = Normalized ISUP | Bit-Field |

**Table 8: Message Data Structure to be used with the 'sorp' PRIMITIVE**

Each socket will default to disable broadcast phase and response method MTP Primitives option. By defaulting to not enabling primitives, the sockets will act the same as they did for TALI 1.0. A socket will return to its default settings once the socket closes. Therefore, after a socket is reconnected, the IP device is expected to retransmit its 'sorp' configuration request. In addition, an IP device can change its filtering preference after a connection has been established. The SOCKSTATE PASS command, as described in Section 4.7.1, will be modified to display the current settings for the dynamically registered socket options.

## 3.2 Congestion Abatement

When a service PDU encounters a congested link, a TFC will be returned to the originator of the service PDU with the concerned point code indicating which node is in congestion. When the Gateway layer on the SG receives the TFC, the TFC will be converted to a CONG LVL primitive and will be sent to all the IP-NEs that match socket selection criteria described in Section 3.4. The concerned point code field in the CONG LVL primitive will be set to the destination field of the TFC message. The source point code in the CONG LVL primitive will be set to the DPC of the TFC. The congestion level in the CONG LVL primitive will be set to the status field of the TFC. Table 9 shows how the following TFC will be converted to a CONG LVL primitive.

```
The format of the TFC message is shown below for clarity:

*** Start of MTP Level 3 ***
                MSU
003 10000000 80
    ----0000    Service Indicator                    0000 - Network Mgmnt.
    --00----    Network Priority                     00 - priority 0
    10------    Network Indicator                    10 - National Network
004 00000100 04 Destination Point Code               4-4-4
005 00000100 04
006 00000100 04
007 00000011 03 Origination Point Code               3-3-3
008 00000011 03
009 00000011 03
010 00000001 01 Signaling Link Selection             1

*** Start of Network Management ***
                Transfer-controlled
011 00100011 23 Heading Code
    ----0011    Heading Code 0                       03
    0010----    Heading Code 1                       02
012 00000101 05 Destination                          5-5-5
013 00000101 05
014 00000101 05
015 00000010 02
    ------10    Status                               10 - status 2
    000000--    Spare                                00
```

| Octets | Field Name | Value |
|---|---|---|
| 0..3 | SYNC | 'TALI' |
| 4..7 | OPCODE | 'mgmt' |
| 8..9 | LENGTH | 22 |
| 10..13 | PRIMITIVE | 'mtpp' |
| 14..17 | MTPP OPERATION | 0x0007 = Congested Destination, w/ Cong Level |
| 18..21 | Concerned Point Code | 5-5-5 |
| 22..25 | Source Point Code | 4-4-4 |
| 26..27 | Congestion Level | 0x0002 = Congestion Level 2 |
| 28..29 | Cause Code | 0 |
| 30..31 | User ID | 0 |

**Table 9: CONG LVL Example**

This feature provides the tools that allow the IP node to abate this congestion via the CONG AUD and CONG LVL primitives. The IP-NE is responsible for abating the congestion. To abate the congestion, an IP-NE will request the current congestion level for a point code using the CONG AUD primitive. The SG will generate a signaling-route-set-congestion-test (RCT) message on behalf of the IP-NE and route the message through the network. The IP-NE should generate a CONG AUD primitive with the following fields:

1. Concerned Point Code – congested point code returned in the CONG LVL primitive
2. Source Point Code – point code to be used as the OPC of the RCT
3. Congestion Level – congestion level to abate based on the congestion level returned in the CONG LVL primitive
4. Cause Code and User ID – should be initialized to 0

The source point code field is used in determining the requestor when a single socket is connected to multiple point codes. Consider the routing key table shown in Table 10. If a CONG AUD primitive is received on socket SS3, the SG doesn't know which point code to use as the OPC in the RCT message. Therefore, the source point code field of the primitive will be used for this purpose.

| Socket | DPC | SI | SSN | OPC | CICS | CICE |
|---|---|---|---|---|---|---|
| SS1 | 1-1-1 | 0 | X | X | X | X |
| SS2 | 1-1-1 | 0 | X | X | X | X |
| SS3 | 1-1-1 | 0 | X | X | X | X |
| SS3 | 1-1-2 | 1 | X | X | X | X |
| SS3 | 1-1-3 | 2 | X | X | X | X |
| SS3 | 1-1-4 | 0 | X | X | X | X |
| SS4 | 1-1-4 | 1 | X | X | X | X |
| SS5 | 1-1-2 | 5 | X | 6-6-1 | 1 | 100 |

**Table 10: Routing Key Table**

Another issue to be addressed is when multiple IP devices try to abate congestion for a single point code. Assume a service PDU is sent from socket SS1 and encounters a congested link. A TFC will be returned to the SG with the DPC set to 1-1-1. Since the SG has no knowledge of the socket that transmitted the original service PDU, a CONG LVL primitive will be transmitted to sockets SS1, SS2 and SS3 (assuming response method primitives are enabled). The source point code in the primitive will be set to 1-1-1. The IP devices connected to these 3 sockets could then each send a CONG LVL primitive to abate this congestion. To avoid multiple RCT messages concerning the same point code being sent from SG (multiple IP-NEs trying to abate congestion level of same point code), the SG maintains a list of point codes for which RCT messages have been sent and it suppresses duplicate RCTs to the same point code. A duplicate RCT is one which the concerned point code and source point code are identical to a previous request for congestion status.

The list is maintained for 40 point codes, and the entries are time stamped when the entry is written to the table. An entry is stored in the table only for 0.5 sec. After 0.5 sec, the entry(s) will be removed. When the table is full, if the SG receives a CONG AUD primitive for a point code that is not in the list, a RCT message will be generated but the point code will not be stored in the table.

```
The format of the RCT message is shown below for clarity:

*** Start of MTP Level 3 ***
                MSU
003 00000000 00
    ----0000    Service Indicator                       0000 - Network Mgmnt.
    --00----    Network Priority                        00   - priority 0
    00------    Network Indicator                       10   - National Network
004 00000000 00 Destination Point Code                  0-0-0
005 00000000 00
006 00000000 00
007 00000000 00 Origination Point Code                  0-0-0
008 00000000 00
009 00000000 00
010 00000000 00 Signaling Link Selection                0

*** Start of Network Management ***
                Route-set-congestion-test
011 00010011 13 Heading Code
    ----0011    Heading Code 0                          03
    0001----    Heading Code 1                          01
```

The above RCT message will use the following fields modified:

- The DPC needs to be set to the concerned point code value in the CONG AUD primitive
- The OPC needs to be set to the source point code value in the CONG AUD primitive
- The SLS needs to be randomized
- The Network Priority needs to be set to the congestion level value in the CONG AUD primitive

## 3.3 Primitive Replication

The TFP, TCP, TFA, TCA, UPU and TFC MSUs sent from MTP3 to the Gateway Layer are converted into a primitive to be sent to potentially many sockets. Since there may be up to 50 sockets associated with a single destination point code, each message could result in 50 TALI messages. This one to many replication can generate a large number of TALI messages. The handling of this traffic is discussed in Section 3.6.

## 3.4 Socket Selection

### 3.4.1 Broadcast Phase

The broadcast phase MSUs listed as the first four events in Table 6 will need to be sent to every socket which has broadcast phase enabled.

### 3.4.2 Response Method TFCs/UPUs

For response method TFCs and UPUs (events 5 and 6 in Table 6), the response method parameter must be enabled as well as performing the following steps:

1. Check the route key table and make a list of every entry that:
   i) If SI is ISUP (5), the DPC in the route key table entry matches the DPC of the message and the OPC in the route key table entry matches the concerned point of the TFC/UPU
   ii) If SI is not ISUP (5), the DPC in the route key table entry matches the DPC of the message
2. Send primitive to every socket in the list

Note:

1. TFC & UPU messages are always considered as response method messages.
2. TFP & TCP messages will be considered response method messages only if a valid socket index in the message, otherwise they will considered as broadcast method messages
3. TFA & TCA will always considered as broadcast phase messages.

### 3.4.3 Response Method TFPs/TCPs

The response method TFPs and TCPs (events 7 and 8 in Table 6) will need to be sent to the socket which the original PDU was received on if response method is enabled.

Currently as TALI messages are received, the socket index is stored in the extended data area of the system buffer containing the PDU. The downside of this is that the extended data area is not protected from being overwritten. For this feature, the socket index will be stored in the overhead portion of the system buffer as well as a flag to indicate if the socket index is valid for messages received and for response method TFPs/TCPs that came down to level 2 for transmission. This will be used for determining whether a TFP/TCP is a broadcast phase or a response method.

## 3.5 Point Code Availability Determination

Both point code audit (PC AUD) and cluster audit (CL AUD) primitives require determination of a point code's availability. Various rules apply for making this determination and are documented in Table 11. The criteria for making this determination are summarized as follows:

- True Point Code – the concerned point code specified in the audit primitive is the SG's true point code
- Capability Point Code – the concerned point code specified in the audit primitive is a capability point code for the SG
- SCCP service allowed – indicates if the capability point code is allowed based on the status of the SCCP card and the status of the local subsystem associated with the CPC
- Route exists in Table - indicates point code was entered in the destination table via the ENT-DSTN command. This is not to be confused with the IP7 routing key table. If not found and concerned point code is an ANSI full point code, a lookup for the corresponding cluster is performed.
- ANSI – byte 3 of SS7 Point Code structure as defined in [3] indicates if point code is ANSI or ITU
- Cluster unknown - A cluster is unknown if the following are true:
    1. there is no provisioned cluster entry for the route key
    2. there is no full point code or true/capability point code entry that matches the cluster
- Danger of Circular Routing – indicates possibility of circular routing as determined by existing SG rules
- Destination Accessible – indicates a route is available to the DPC
- Home Cluster – indicates if the SG's true point code or any of its CPCs are a member of a provisioned cluster

| Primitive Received | True Point Code | Capability Point Code | SCCP service allowed | Route exists in Table | ANSI | Cluster unknown | Danger of Circular Routing | Destination Accessible | Home Cluster | Primitive Transmitted |
|---|---|---|---|---|---|---|---|---|---|---|
| PC AUD | Y | N | X | X | X | X | X | X | X | PC AV[1] |
| | N | Y | Y | X | X | X | X | X | X | PC AV |
| | N | Y | N | X | X | X | X | X | X | PC UA |
| | N | N | X | N | Y | Y | X | X | X | CL UA |
| | N | N | X | N | Y | N | X | X | X | PC UA |
| | N | N | X | N | N | X | X | X | X | PC UA |
| | N | N | X | Y | X | X | Y | X | X | PC UA |
| | N | N | X | Y | X | X | N | N | X | PC UA |
| | N | N | X | Y | X | X | N | Y | X | PC AV |
| CL AUD | X | X | X | N | X | Y | X | X | X | CL UA |
| | X | X | X | N | X | N | X | X | X | CL AV[2] |
| | X | X | X | Y | X | X | Y | X | N | CL UA |
| | X | X | X | Y | X | X | N | N | N | CL UA |
| | X | X | X | Y | X | X | N | Y | N | CL AV[2] |
| | X | X | X | Y | X | X | X | X | Y | CL AV[2] |

Y=Yes, N=No, X=Don't care

**Table 11: Point Code Availability Rules**

Notes:

1. If a service PDU is received with a true point code and SCCP service not allowed, MTP3 would return a response method UPU. An audit of this point code will result in a PC AV being transmitted.
2. These queries will not affect the stopping of MTP3 T8 and T18 timers like RSx/RCx messages would.

The following point code audits will be discarded:

- Any audit received during full restart.
- Audit request would cause card level congestion.
- Cluster audits that provide a full point code instead of cluster point code.
- Point code audits that provide a cluster point code instead of a full point code.
- Cluster/Point code audits that provide an illegal point code format.

## 3.6 Capacity

MTP Primitives received from the IP-NEs will be counted towards rated receive capacity of SG and MTP primitives that are transmitted from the SG to IP-NEs will be counted towards the rated transmission capacity of the SG.

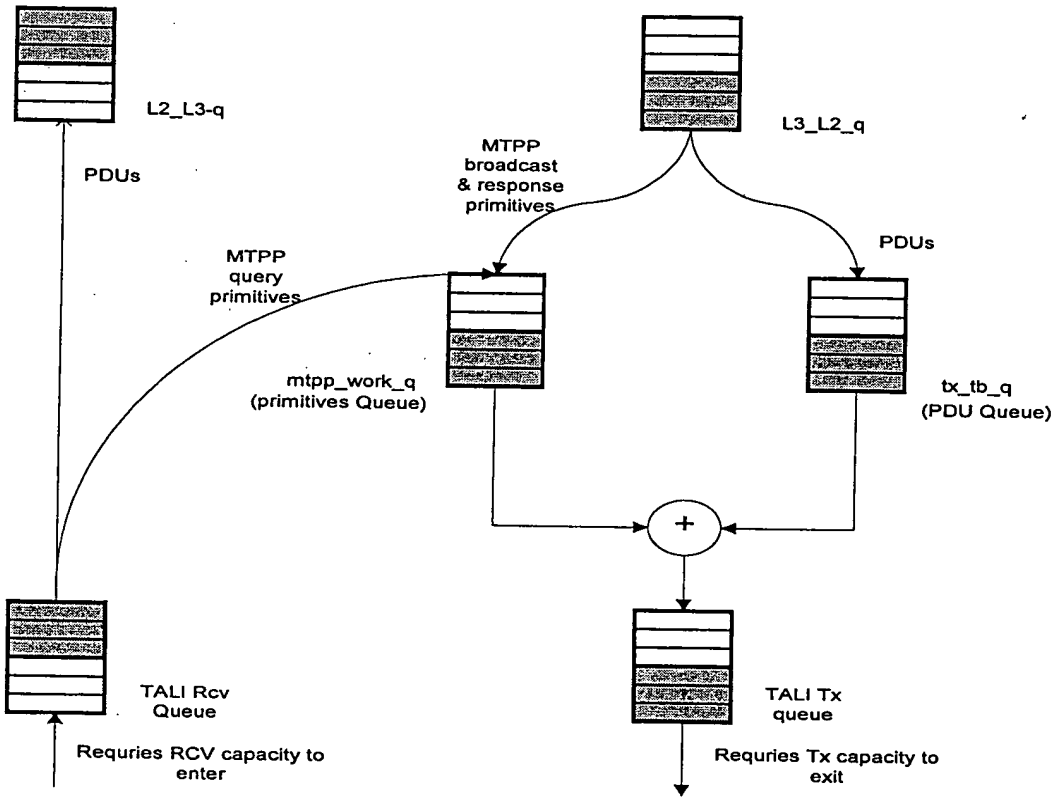


**Figure 3: MTP Primitives capacity**

MTPP primitives and the normal PDU traffic will be combined for transmission to TALI layer as shown in the above figure. If the total number of messages (PDU + MTPP primitives) is above the rated capacity of the SG, the link will go into congestion and the PDU will be discarded based on the congestion level of the link.

Illustration of congestion based on 2000 MSU/Sec rated capacity of SG:

If there were 1990 PDU/Sec being transmitted to TALI queue, and if there is 1 broadcast message that needs to be replicated to 10 sockets, the total number of PDU transmitted will be 2000. If there is one additional PDU/sec, then PDU transmission will be delayed by 1 second. For each additional second one PDU will be delayed and if this continues for 1000 seconds, there will be 1000 PDUs delayed, which will fill up the congestion queue. The card enters congestion when the congestion queue is full.

## 3.7 Card Level Congestion

For determination of congestion, number of messages in three different queues will be summed and compared to the congestion threshold table (Congestion threshold table is not modified for this feature). The three different queues are:

- PDU queue
- L3_L2_q
- Primitives queue

  This feature will provide depth of the primitives queue for use in the card level congestion calculation since it represents outstanding level 2 work.

## 3.8 User Part Unavailability Mapping

When the Gateway layer on the SG receives an UPU, the UPU will be converted to an UP UA primitive and will be sent to all the IP-NEs that match socket selection criteria described in Section 3.4. The concerned point code field in the UP UA primitive will be set to the destination field of the UPU message. The cause code in the UP UA primitive will be set to the unavailable cause code field of the UPU. Table 12 shows how the following UPU will be converted to an UP UA primitive.

```
The format of the UPU message is shown below for clarity:

*** Start of MTP Level 3 ***
                MSU
003 10000000 80
    ----0000    Service Indicator                    0000 - Network Mgmnt.
    --00----    Network Priority                     00 - priority 0
    10------    Network Indicator                    10 - National Network
004 00000001 01 Destination Point Code               1-1-1
005 00000001 01
006 00000001 01
007 00000010 02 Origination Point Code               2-2-2
008 00000010 02
009 00000010 02
010 00000000 00 Signaling Link Selection             0

*** Start of Network Management ***
                User Part Unavailable
011 00011010 1a Heading Code
    ----1010    Heading Code 0                       10
    0001----    Heading Code 1                       01
012 00000011 03 Destination                          3-3-3
013 00000011 03
014 00000011 03
015 00100011 23
    ----0011    User ID                              0011 - SCCP
    0010----    Unavailable Cause Code               0010 - Inaccessible remote user
```

| Octets | Field Name | Value |
|---|---|---|
| 0..3 | SYNC | 'TALI' |
| 4..7 | OPCODE | 'mgmt' |
| 8..9 | LENGTH | 22 |
| 10..13 | PRIMITIVE | 'mtpp' |
| 14..17 | MTPP OPERATION | 0x0009 = User Part Unavailable |
| 18..21 | Concerned Point Code | 3-3-3 |
| 22..25 | Source Point Code | 0 |
| 26..27 | Congestion Level | 0 |
| 28..29 | Cause Code | 0x0002 = User Part Inaccessible |
| 30..31 | User ID | 3 - SCCP |

Table 12: UP UA Example

# 4. FUNCTIONAL REQUIREMENTS

## 4.1 PFS Compliance Matrix

FC — Fully compliant PC — Partially compliant NA — Not applicable

| PFS requirement | Compliance | FD Requirement Number |
|---|---|---|
| [R0009-1] | FC | FD-1 |
| [R0009-2] | FC | FD-2 |
| [R0009-3] | FC | FD-3 |
| [R0009-4] | FC | FD-4 |
| [R0009-5] | FC | FD-5 |
| [R0009-6] | FC | FD-6 |
| [R0009-7] | FC | FD-7 |

**Table 13: PFS Compliance Matrix**

## 4.2 PFS Requirements

The requirements for this feature as defined in [2] are repeated here for clarity of reading. Certain assumptions are made with these requirements concerning exceptional situations. For example, the Broadcast Exception Indicator (BEI) will prevent any broadcast phase primitives from being transmitted even if sockets are enabled to transmit these primitives since broadcast phase messages won't be delivered to the Gateway Layer by MTP3.

| FD Req't # | Required or Optional (R or O) | Requirement Description (and any additional comments if necessary) | Affected GPLs |
|---|---|---|---|
| FD-1 | R | The sending of Primitives shall be configurable on a socket basis via inband registration. | SS7IPGW |
| FD-2 | R | The Secure Gateway shall provide an indication to all IP devices, via a point code/cluster unavailable message, when a point code has become unreachable | SS7IPGW |
| FD-3 | R | The Secure Gateway shall send a point code/cluster unavailable to an IP device in response to a point code status message if the specified point code/cluster is unavailable. The indication will be sent back to the requestor via the same socket which the request was received. | SS7IPGW |
| FD-4 | R | The Secure Gateway shall send a point code/cluster unavailable to an IP device in response to a service message if the destination point code/cluster is unavailable. The indication will be sent back to the requestor via the same socket which the service message was received. | SS7IPGW |
| FD-5 | R | The Secure Gateway shall provide an indication to all IP devices, via a point code available/cluster message, when a point code/cluster has become available | SS7IPGW |
| FD-6 | R | The Secure Gateway shall send a point code/cluster available to an IP device in response to a point code/cluster status message, if the specified point code/cluster is available. The indication will be sent back to the requestor via the same socket which the request was received. | SS7IPGW |
| FD-7 | R | For TFCs destined for an IP node, the Secure Gateway shall send congestion level indication to all IP devices that match the destination point code from the TFC. The congestion level in the TFC will be used for the congestion level in the indication. | SS7IPGW |

**Table 14: PFS Requirements**

## 4.3 General Requirements

| FD Req't # | Required or Optional (R or O) | Requirement Description (and any additional comments if necessary) | Affected GPLs |
|---|---|---|---|
| FD-8 | R | MTPP audit primitives shall be discarded if the total number of messages in the three queues mentioned in the section 3.7 is above the max_bfr_cnt value of congestion threshold table. | SS7IPGW |
| FD-9 | R | Point code/cluster availability/unavailability or congestion level primitives shall be ignored if received by the SS7IPGW card. | SS7IPGW |
| FD-10 | R | The Concerned Point Code parameter of all MTP Primitives received shall be validated as a valid point code. The validation consists of verifying byte 3, which indicates the type of point code, conforms to the definition provided by Table 10 of [3]. Otherwise, the primitive will be discarded. | SS7IPGW |
| FD-11 | R | The Source Point Code parameter of the Request for Congestion Status Primitive (CONG AUD) shall be validated as a valid point code. The validation consists of verifying byte 3, which indicates the type of point code, conforms to the definition provided by Table 10 of [3]. Otherwise, the primitive will be discarded. | SS7IPGW |
| FD-12 | R | The congestion level parameter in the CONG AUD primitive shall be validated as a valid congestion level. The validation consists of verifying the level conforms to the definition provided by Table 19 of [3]. Otherwise, the primitive will be discarded. | SS7IPGW |
| FD-13 | R | The Primitive Operation field of each received primitive will be validated as a valid operation value. The validation consists of verifying the value conforms to the definition provided by Table 19 of [3]. Otherwise, the primitive will be discarded. | SS7IPGW |
| FD-14 | R | Each non-discarded congestion request primitive shall generate a RCT MSU with the DPC, OPC and network priority based on the data in the congestion request primitive. | SS7IPGW |
| FD-15 | R | Each application sockets will default to disable broadcast phase and response method primitive transmissions and return to default state when the socket closes. The IP device is responsible for re-enabling the primitives. | SS7IPGW |
| FD-16 | R | Each transmitted primitive shall be counted as one unit of work with respect to the transmit capacity. | SS7IPGW |
| FD-17 | R | Each received primitive shall be counted as one unit of work with respect to the receive capacity. | SS7IPGW |

**Table 15: General Requirements**

## 4.4 Hardware Requirements
NOT APPLICABLE

## 4.5 Database Requirements
NOT APPLICABLE

## 4.6 Upgrade Considerations
MTP Primitives are prevented from being sent to nodes running the TALI 1.0 interface.

## 4.7 User Interface Requirements

The two major user interface changes for this feature allow the registering of sockets to transmit primitive broadcasts and the display of primitive measurements.

| FD Req't # | Required or Optional (R or O) | User Interface Requirement Description (and any additional comments if necessary) | Affected GPLs |
|---|---|---|---|
| FD-18 | R | The MSUCOUNT PASS command shall be modified to display measurements on a per link basis related the number of primitives transmitted, received and discarded. | SS7IPGW |
| FD-19 | R | The SOCKSTATE PASS command shall be modified to display the version of TALI the far end is using and which MTP Primitives are enabled. | SS7IPGW |

**Table 16: User Interface Requirement Table**

User interface requirements in the Eagle consists of administration and maintenance capabilities. This document has provided an overview of these areas, as they relate to this feature. Table 17 lists the commands affected along with the anticipated changes necessary for this feature.

| Command | Changes |
|---|---|
| pass:loc=xxxx:cmd="sockstate" | Display TALI version and MTP Primitives enabled |
| pass:loc=xxxx:cmd="msucount" | Display MTP Primitive measurements |

**Table 17: Affected Commands**

The command examples in the following subsections are provided to enhance understanding of the requirements and to provide one suggestion for names and output. The complete requirements and functions of the changed commands will be described in detail in their associated Command Specifications. These documents will also provide the actual parameter names, valid values, and output for the commands. The lists of command specification affected by this feature are shown in Table 18.

| Document # | Document Name | Changes |
|---|---|---|
| CS002268.DOC | Maintenance Commands for IP7 | changes for sockstate and msucount |

**Table 18: Affected Command Specifications**

### 4.7.1 SOCKSTATE Pass Command

The SOCKSTATE pass command will be modified to display which MTP Primitives are enabled and the TALI interface version number.

```
> pass:loc=1105:cmd="sockstate c7000"

SOCKSTATE: Socket state history log
           Current settings: -i service tali
           MTP Primitives broadcast phase: enabled
           MTP Primitives response method: enabled
           Normalized SCCP: disabled
           Normalized ISUP: disabled
           Near End TALI version: 2.0
           Far End TALI version: 2.0
           Negotiated TALI version: 2.0

Date       Time           Socket Event
==============================================
99-04-08   10:01:33.570   Socket Created
99-04-08   10:04:21.765   Socket Allowed for Traffic
99-04-08   10:04:55.405   Management Socket Open
99-04-08   10:06:12.030   Link Activated
99-04-08   10:06:12.030   Transition to Connecting
99-04-08   10:06:17.860   Socket Connection Established
99-04-08   10:06:17.860   Transition to NEA-FEP
99-04-08   10:06:17.865   Transition to NEA-FEA
99-04-08   10:16:57.190   Monitor Message Transmitted
99-04-08   10:16:57.200   Monitor-Ack Message Received
99-04-08   10:16:58.170   Test Message Transmitted
99-04-08   10:16:58.180   Allow Message Received

            . . . .

99-04-08   10:20:55.480   Test Message Transmitted
99-04-08   10:20:55.480   Allow Message Received
99-04-08   10:20:55.890   SCCP MSU Transmitted
```

## 4.7.2 MSUCOUNT Pass Command

The MSUCOUNT pass command will be modified to display primitive measurement counts. The three counts will only be displayed on a per link basis and will indicate

1. total number of primitives received which includes received queries processed and received primitives that were discarded
2. total number of received primitives that were discarded which includes excessive query requests and non-queries received
3. total number of primitives transmitted which includes all the replicated primitives

```
-----------------
Link Measurements
-----------------

Transmit Count Total
--------------------
tx bytes:                                  00000
tx msus:                                   00000

Transmit Discard Counts
-----------------------
discarded tx due to special adjpc msu:     00000
discarded tx due to discard all adjpc msu: 00000
discarded tx due to no ss7 rtbl entry:     00000
discarded tx due to no ss7 rtkey:          00000
discarded tx due to no sock avail to pc:   00000
discarded tx due to no sock avail to rtkey:00000
discarded tx due to all sock congested:    00000
discarded tx due to sccp msg type:         00000
discarded tx due to sccp class:            00000

Receive Count Total
-------------------
rcv bytes:                                 00000
rcv msus:                                  00000

Receive Discard Counts
----------------------
discarded rcv due to link state:           00000
discarded rcv due to sccp msg type:        00000
discarded rcv due to sccp class:           00000
discarded rcv due to sccp called party:    00000
discarded rcv due to sccp calling party:   00000
discarded rcv due to isup sio:             00000

MTPP MGMT Primitive Totals
--------------------------
MTPP primitives received                   00000
MTPP primitives discarded                  00000
MTPP primitives transmitted                00000

Stored Transmit Discard Data
----------------------------
no stored transmit discard data

Stored Receive Discard Data
---------------------------
no stored receive discard data
```

## 4.8 TALI Requirements

Table 19 specifies the requirements for the TALI Layer for this feature.

| FD Req't # | Required or Optional (R or O) | Requirement Description (and any additional comments if necessary) | Affected GPLs |
|---|---|---|---|
| FD-20 | R | The TALI layer shall provide on a per-socket basis a string indicating what version of the TALI interface that the SG is capable of communicating. This version is also referred as the "near end" capable version. | SS7IPGW |
| FD-21 | R | The TALI layer shall provide on a per-socket basis a string indicating what version of the TALI interface that the IP node is capable of communicating. This version is also referred as the "far end" capable version. | SS7IPGW |
| FD-22 | R | The TALI layer shall provide on a per-socket basis a string indicating as to what version of the TALI interface has been negotiated between the SG (near end) and IP node (far end). | SS7IPGW |

**Table 19: TALI Requirement Table**

# 5. PERFORMANCE

A key question that must be answered for this feature is "what would happen if every socket polled for every point code?". The DCM could easily be overwhelmed. The answer is to limit the number of audits processed. As stated in requirement FD-8, audits will be discarded if the congestion threshold is exceeded. If the primitive is discarded, a measurement logged. Since route-set-test messages, which are similar to audits, are limited to approximately every 30 seconds, it is assumed the IP device will only query at a similar rate.

# 6. RELIABILITY

This feature improves the network reliability by providing notifications to the IP-NE so it can direct traffic to the mated SG provided it has a secondary socket. There is no system reliability impact to the SG because of this feature. Without this feature there is no notification to an IP node that MSUs cannot be routed to their destination, so traffic is thrown away silently.

With broadcast phase status change primitives not being transmitted to an IP node, the indications will still get to the IP node because of support for the response method.

It should be noted that all non-query primitives received by the SS7IPGW card would be discarded. Furthermore, excessive queries will be discarded. Excessive queries can be eliminated if the IP node will only send a request once the previous request has been acknowledged. This will allow a minimum of one query per socket to be processed.

Each congestion request can generate a TFC that would need to be broadcast to multiple sockets. The IP node will need to implement a congestion abatement procedure such as the one documented in section 13 of [11].

To ensure that IP-NE gets the correct information about a PC, the last primitive sent by the SG will always provide the correct information. This is achieved by keeping each phase of primitive independent of each other. That is, transmission of a PC UA primitive in response to a PDU to a prohibited PC will not have effect on either transmission of broadcast or on query response primitive and so on. The down side of this solution is: the IP-NE may get multiple primitives giving the same information or the worse case, it might get a primitive with stale/wrong information followed by a primitive with correct information.

## 6.1 Primitive Duplication

Duplicate primitives will be transmitted if the craftsperson has configured duplicate sockets to the same hosts. This is a user configurable condition that will not be prevented by this feature. However, there will be no duplicate response method TFP/TCP primitive transmissions due to the Gateway Layer and MTP3 both performing response method.

## 6.2 Lost Messages

There exists the possibility for an IP device to not receive response method notifications. Consider the network diagram in Figure 4. Suppose MGC 1, whose point code is 4-4-4, sends a MSU to 1-1-1 using the socket on DCM 2. For some reason, a response method MSU is returned but due to SLS problems, the response is sent to DCM 1. DCM 1 cannot send the response to MGC 1 because the socket is down. However, there is a socket to MGC 2 that also has a point code of 4-4-4. So DCM 1 will believe it has sent the appropriate notification to the originator of the MSU when it actually did not.

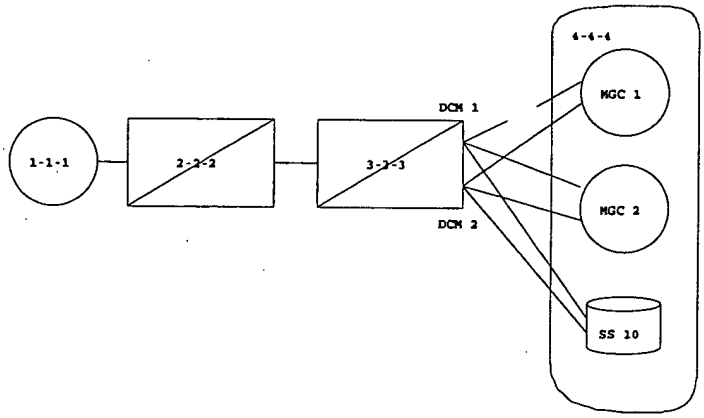


**Figure 4: Lost Response Method Network Diagram**

# 7. SERVICEABILITY

This feature is designed to provide MTP status information to IP connected network elements.

Several commands have been modified to assist the customer and customer service in using this feature. These changes are detailed in Section 4.7 and are summarized below:

- SOCKSTATE provides the capability to determine if a socket is configured to transmit MTP primitives and what version of the TALI interface is being used
- MSUCOUNT provides the measurement of primitives transmitted, received and discarded on a per link basis

There is no impact to customers using the existing TALI 1.0 interface. To gain benefit of this feature, the IP-NE must use the TALI 2.0 interface.

There are two reasons primitives will be discarded instead of being transmitted:

1. socket not configured to transmit primitive
2. socket not in established state

The Broadcast Exception Indicator (BEI) of the ENT-DSTN command, which specifies whether the SG broadcasts network management message to adjacent signaling points, will essentially turn off primitive broadcasts.

# 8. LIMITATIONS

One capability this feature provides is for an IP device to build up routing tables before sending traffic. This is similar to the MTP Restart feature [10]. However, an important distinction is that traffic is not stopped while route status information is being provided to the IP device.

The following assumptions are made with respect to the IP node:

- the IP node is responsible for abating congestion
- the IP node is responsible for understanding cluster point codes
- the IP node must not generate excessive audits (see section 5)

# 9. APPENDIX A - PEER REVIEW CHECKLIST

**Do not delete this checklist. It shall be used at each peer review to ensure that all necessary attributes of the document are included.**

| Item | Compliance (Yes, No or N/A) |
|---|---|
| Was the template used and are all sections included (NA sections are so noted, not deleted)? | |
| Do the version numbers in the change history, header and footer of this document match the version number in the document control system? | |
| Were the correct quorum members present or represented per the Peer Review procedure? | |
| Are all applicable TEKELEC reference documents are cited? | |
| Are all applicable PFS requirements documented in the PFS Compliance Matrix section? | |
| Are the FD requirements correctly numbered and documented? | |
| Are there any patentable ideas resulting from the specification/design work in the document? | |
| Is there an explanation in the "Limitations" section of all FD requirements that were not fully compliant? | |
| Are the requirements "testable"? | |
| Were soak time requirements addressed in the performance section? | |
| Are there any changes to existing outputs or new error outputs that may impact the customer? If so, are they identified and appropriately documented in the user interface and serviceability sections? | |

**Table 20: Document Approval Checklist**

## 10. APPENDIX B - REVIEW SUMMARIES

E-mail to "Meeting Minutes" and Project Team

REVIEW MEETING SUMMARY REPORT

Review: IP7 Secure Gateway 2.0 MTP Primitives
Document: fd002782.doc
Revision: 1.0
Date: October 11, 1999 3:00 - 5:00 pm
Author: Keller/Khadri
Review#: 1
Moderator : Don Hunnicutt
Recorder : Joe Keller

Reviewers:

| Name | Functional Area | Review Time | Score |
|---|---|---|---|
| David Sprague | Software Dev | 45 min | 3 |
| Ralph Garrett | Product Verification | 20 min | 3 |
| Don Hunnicutt | FOA | 30 min | 3 |

Not attending:

| | | | |
|---|---|---|---|
| Michael Thomas | Documentation | delegated to Sprague | |
| John Mason | Marketing | delegated to Sprague | |
| Andreas Nikas | Technical Service | delegated to Hunnicutt | |
| Jim Ferrigan | Customer Engineering | delegated to Hunnicutt | |
| Tricia Payne | Quality | comments provided (15 min | 3) |
| Jerry Cox | Training | no reason provided | |

Review conclusion by Moderator ==== 3

(1) Unable to perform review
(2) Unable to complete the review, another review required
(3) Review completed, no more reviews required
(4) Review completed pending changes, author will route for approval

Average review preparation time : 27.5 minutes

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Actions & Issues
Modify TALI 2.0 TR to add User ID field for UP UA primitives.

| General Comments | Actions |
|---|---|
| 1) Remove left side of the footer completely. | Removed |

| Specific Comments | Actions |
|---|---|
| 1) page 1 Change EAGLE to IP7 | Changed |
| 2) page 1 Consider removing Secure Gateway from title | Considered, not changed |
| 3) page 1 List all authors instead of just Tekelec | Changed |
| 4) page 13 Length in Table 9 wrong | Corrected |
| 5) page 13 Show all fields in primitive in Table 9 | Done |
| 6) page 14 Remove first sentence | Removed |
| 7) page 14 Clarify duplicates in last paragraph | Done |
| 8) page 16 Make subsections and clarify 3.4.3 | Done |
| 9) page 17 Clarify wording in bullets 4 and 6 | Done |
| 10) page 19 Length in Table 12 wrong | Corrected |
| 11) page 19 Show all fields in primitive in Table 12 | Done |
| 12) page 25 GR-246-CORE not in reference section | Updated |
| 13) page 27 Remove first paragraph | Removed |